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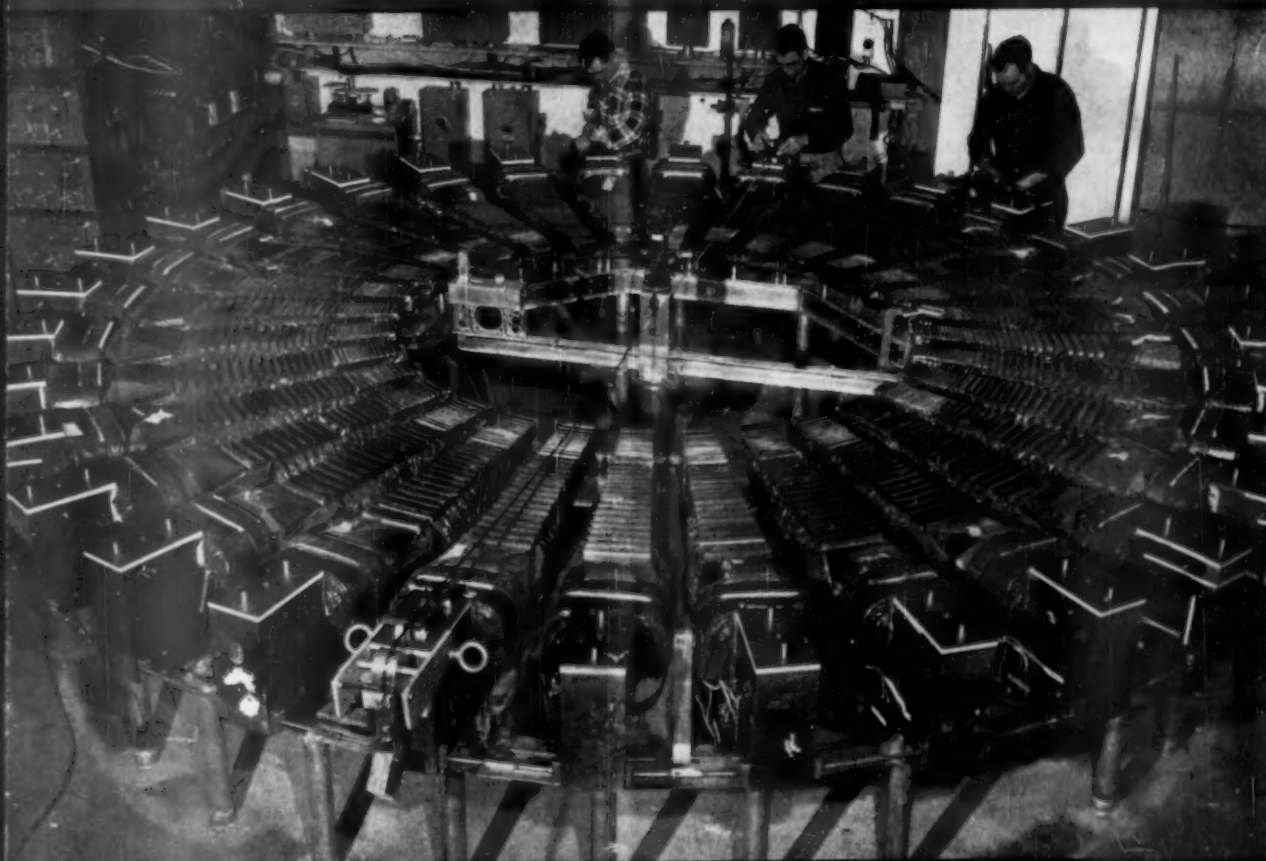
March 21, 1959

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



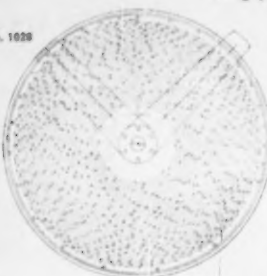
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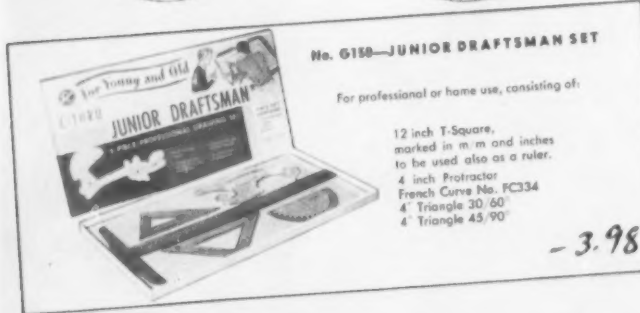
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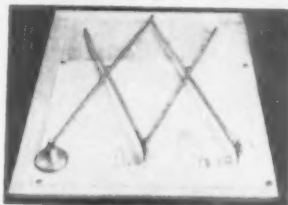
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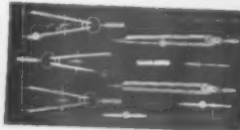
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METEOROLOGY

Jet Age Weather Charts

A special network has begun transmitting weather charts for forecasting weather conditions at the high altitude jet and turbo-prop pilots use for flight.

► JET AGE weather charts for forecasting flying conditions at levels between 20,000 and 45,000 feet are now being transmitted daily on a national facsimile network.

Dr. F. W. Reichelderfer, U. S. Weather Bureau chief, reported that a special facsimile network has begun transmission of 43 high-level charts every 24 hours to provide jet and turbo-prop pilots with the latest aviation weather data. The special charts are needed in planning high altitude flights for both domestic and international air routes.

The new facsimile network links the Weather Bureau's high altitude forecast centers at Suitland, Md., and Idlewild Airport, N. Y., with airports at Boston, Philadelphia, Baltimore, Washington, Miami, Detroit, Chicago, Kansas City, Denver, El Paso, Los Angeles and San Francisco.

Facsimile circuits are provided by the American Telephone and Telegraph Company. Transmitting and receiving equipment was built and installed by the Alden Electronic Company of Westboro, Mass.

Jet pilots and airline staffs need to know not only the usual information about weather conditions up to 20,000 feet at airports and along air routes but also wind direction and speed, temperatures and other factors at much higher altitudes. The new weather charts show predicted weather and wind flow patterns for more than a quarter

of the earth's surface, from Japan and the Philippine Islands eastward over North America to western Europe, and from the North Pole to the equator.

The new jet weather service is part of a comprehensive plan for improved aviation forecasting. The charts are transmitted by a new flat-bed scanner that permits, for the first time, immediate and continuous sending of large-size weather maps. The charts are prepared with the help of an International Business Machines computer from information received from hundreds of upper air observation points.

Science News Letter, March 21, 1959

PUBLIC SAFETY

Your Portable Radio May Warn of Radiation

► THE ATOMIC Energy Commission is working on development of a radiation detection instrument that will fit into transistor radios.

AEC Commissioner Dr. Willard F. Libby said in this way any person would be able to buy for a small extra sum protection in case of nuclear war. He told the Purdue chapter of the Society of Sigma Xi that such a device could also be used as a means of communications.

The aim is to develop an instrument

sufficiently cheap so manufacturers can afford to put it into transistor radios by the millions. These could be advertised with a stamp of Government approval as a radiation monitor, Dr. Libby said.

Science News Letter, March 21, 1959

ENGINEERING

Test Model Completed For MURA Atom Smasher

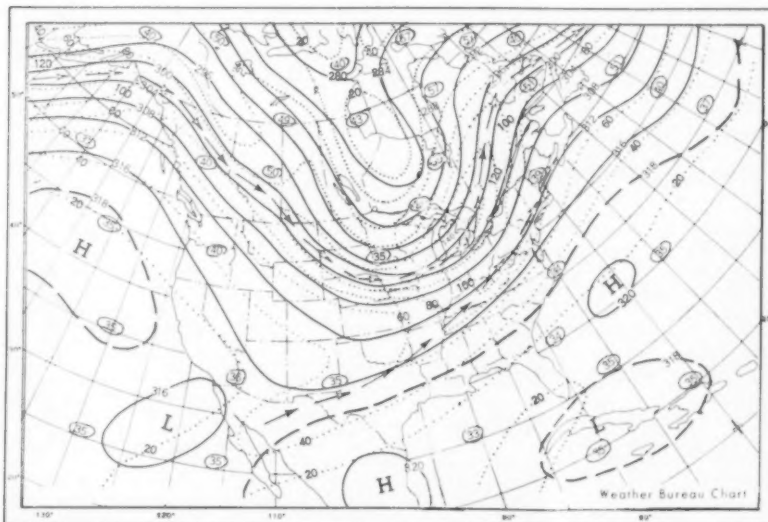
See Front Cover

► THE BOTTOM tier of the 32-magnet assembly in the 50-million electron volt model atom smasher has been put together by Midwest Universities Research Association (MURA) at its site 10 miles southeast of Madison near Stoughton, Wis. Actually these are just half-magnets. Each of the completed pieces weighs 1,400 pounds—altogether more than 40 tons. This test model that accelerates electrons, shown in the photograph on the cover of this week's SCIENCE NEWS LETTER, is the forerunner of the giant atom smasher MURA scientists hope to build on the same site.

Complete magnets resemble the open jaws of a crocodile, each looking into the center of the circle. Atomic particles moving in a doughnut-shaped vacuum tube between the upper and lower jaws will be bent and focused in a circular path by the pull of the magnets.

In the giant machine proposed by MURA two oppositely directed proton beams will move roughly a quarter of a million times per second around a circle 1,200 feet in diameter, and produce one million proton-proton collisions per second in a four-inch interaction region. The fixed magnetic field in the MURA design makes it possible to "stack" protons inside the atom smasher.

Science News Letter, March 21, 1959



WEATHER CHART—Solid lines show heights (contours) of 300 millibar surface in hundreds of feet. Encircled figures are temperatures in minus degrees centigrade. Dotted lines are isotachs showing wind speeds in knots. Arrows shown fly with the winds along the principal jet streams. In the photograph Dr. F. W. Reichelderfer (right), chief of the U. S. Weather Bureau, watches the first map reception in Washington with G. F. Stafford, marketing vice president of the Alden Electronic Company, Westboro, Mass.

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ARCHITECTURE

Buildings Packaged in Glass Envelope

► AN IDEA which "could revolutionize our whole notion of exterior architecture and internal air conditioning and illumination" is being studied at Pennsylvania State University.

The idea is to enclose whole buildings in a glass package. This is called the "air wall construction" by William Hajjar, professor of architecture who also is a practicing architect.

The glass envelope would be spaced from the building's actual facing at any desirable distance. A blanket of air would be circulated round-and-round or up-and-down the building in the space between the wall and glass.

The glass envelope would, first, protect the building, eliminating problems of weatherproofing, and, second, the circulating air would become a built-in climate controller.

Thus the circulating blanket would move sun-warmed air to the cool sides of the building, and vice versa. In winter, heat could be added to this circulating blanket, eliminating duct systems. Mr. Hajjar thinks the idea in practice would help yield comfortable temperature and humidity conditions everywhere in the building.

Furthermore, the scheme offers dramatic possibilities in lighting. At a flick of the switch the air space could be illuminated to provide "daylight" inside at night.

From the angle of architectural design, the air-wall construction is said to offer "every possibility from the virtually inconspicuous to the spectacular." Maintenance would amount to mere washing.

Mr. Hajjar is now probing the engineering aspects with help of architectural engineer Melvin Isenberg, also of Pennsylvania State University. The work is being sponsored by Pittsburgh Plate Glass Company.

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ENGINEERING

New Generator Uses "Idle" Atomic Wastes

► A NEW generator is expected to "open the door" to unlimited practical usage of waste atomic products now lying idle in safe storage.

The five-pound thermoelectric generator, fueled with the radioisotope polonium-210, was developed in four months for the Atomic Energy Commission by The Martin Company of Baltimore, Md., in conjunction with the Minnesota Mining and Manufacturing Company of St. Paul, Minn.

Known as SNAP III, which stands for System for Nuclear Auxiliary Power, the unit's vital statistics are these: nearly five inches in diameter, five and one-half inches tall, five watts initial output of power. In the course of 280 days, two half-lives of the polonium source, SNAP III could produce an estimated quantity of electricity equal to 1,450 pounds of the best conventional batteries available," according to White House sources.

Its first applications are expected to be in the United States satellites, to power radios and instruments. But improvements might suit it to air and sea navigation aids, or perhaps even telephone and telegraph lines.

The AEC said the first generator cost \$15,000, but this cost would drop to \$200 on a production basis, exclusive of fuel. Polonium-210 is expensive, but the AEC officials said a much less costly atomic waste product could be used instead.

At its full charge of 3,000 curies, the unit produced five watts of power at eight percent to ten percent efficiency. But after polonium passed its half-life of 140 days, the power dropped to three watts.

Science News Letter, March 21, 1959

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AGRICULTURE

Farming Returns to Negev

The discovery of a system of desert farming that was used successfully thousands of years ago holds great promise for agriculture throughout the arid zone regions of the world.

By BENITA TALL
From Beersheba, Israel

► THE DESERT is being farmed again.

Pomegranates and olive trees are being planted on land last farmed by the Byzantine farmers and their predecessors, the Nabateans, some 2,000 years ago. If the results show that fruit trees, grapes, and other farm crops can be grown where only three to five inches of rain fall each year, an important step will have been taken in conquering and controlling the desert.

About 28 miles south of Beersheba, on the road to Egypt across the Sinai peninsula, archaeologists have uncovered an ancient farm. A small group of researchers will live on this farm and plant the same crops and trees grown so long ago. In this way they will be able to study the desert under the actual living and farming conditions experienced by the Byzantines.

Prof. Michael Evenari, botany professor and vice president of Hebrew University in Jerusalem, plans to set up house with his wife in a 2,000-year-old farmstead near the site of the Nabatean city of Subeita. There his group, which includes water engineer Leslie Shennon, agriculturalist Naphtali Tadmore, archaeologist Dr. Y. Aharoni and Yossi Feldman, an amateur archaeologist, will use "home grown" water and study

the irrigation system that enabled the early farmers to grow crops successfully.

This irrigation system consisted of flood irrigation, terracing and cisterns for water storage.

Apparently well-developed agricultural projects, ranging in size from one acre to several hundred, were established in the flood plains and wadis. The slopes of the surrounding hillsides served as water collectors for producing irrigation water and also for extensive grazing, Prof. Evenari explained. Small round piles of stones and pebbles, spaced in rows along the hillsides, are believed to have directed the rain water down the slopes onto the fields.

The fields themselves were irrigated by a system of canals, spillways, drop structures and division boxes all made of stone. Some of the canals, Prof. Evenari said, were a mile long and several yards deep.

By opening and closing canals it was possible to control water flow so that it penetrated the soil slowly to a depth as great as four yards. At the Subeita farm there are some 16 alternate ways to direct the flood waters. Strong stone walls, built to last, prevented the rainwater from running off.

The farmhouse in which the Evenaris will live is believed to be typical of the farming developments that grew up in the desert near important cities. Five terraced acres have been reconstructed, while the

farmhouse, which is quite well-preserved, needs repairs. Lighting provided by wind-motor power will be one of the few concessions to modern living.

If their study is successful, Prof. Evenari believes there will be three important objectives achieved:

1. Scientists will have proved deserts can be farmed without bringing in costly irrigation water from the outside.
2. Waste rain water will be put to use, saving irrigation water.
3. Large areas of desert throughout the world can be developed and settled. Specifically the desert researchers expect to investigate problems, some of them never before studied systematically with care and accurate measurements, such as the desert rainfall patterns and characteristics and quantities and runoff rates from desert surfaces. Related problems include: ways to increase runoff rate; soil water and plant relationships in the desert; use of wind-breaks and drought-resistant trees in arid zones.

"There are theories for and against the feasibility of farming the Central Negev highlands without pipe line irrigation," Prof. Evenari said. "But this will be the first time that anyone has tried it out in actual practice."

The experiment is certainly worth making, he believes. Thousands of desert people throughout the world will be "watching" the experiment which promises so much for them.

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ENGINEERING

Plastic Artificial Moon Could Relay Radio Waves

► A PLASTIC artificial earth satellite could be used to relay radio and television waves around the world and help mariners chart their courses.

The sphere would be hurled 1,000 miles into space in a deflated state. Once there, a one-pound container of gas would inflate the sphere for its orbital journey, scientists at the Aviation Conference of The American Society of Mechanical Engineers learned.

The versatile moon would be covered with a thin film of vapor-deposited aluminum to make it visible on earth, provide a good reflecting surface, and protect it from prolonged exposure to the sun.

The sphere's prototype, reported George P. Wood and Arlen F. Carter, aeronautical research engineers at the National Aeronautics and Space Administration's Langley Research Center in Virginia, would be 100 feet wide and weigh about 100 pounds.

The engineers estimate that between ten kilowatts and ten megawatts should be enough power to shoot radar beams to the satellite.

The bright aluminum surface, they said, would make the proposed space outpost far brighter than all but two stars and four planets.

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DESERT FARMERS—Prof. and Mrs. Michael Evenari stand in a corner of the ruins of the ancient city of Subeita. Near this city evidence has been found of an elaborate system for desert farming.

BIOLOGY

Virus Has "New" DNA

A single strand of DNA, or deoxyribose nucleic acid, has been found in a dwarf virus, a discovery that may revolutionize current concepts in the mechanisms of heredity.

► THE BASIC, simple hereditary chemical found in all living things, DNA, has been further simplified.

A dwarf virus known to infect and destroy sewage bacteria may be causing a profound change in our ideas on the mechanism of heredity.

A biochemist at the California Institute of Technology reported that he has found this dwarf virus with only one strand, not two, of DNA. In this respect the virus might be described as a simpler form of life, Dr. Robert L. Sinsheimer explained.

It consists of a single strand of DNA, or deoxyribose nucleic acid, wrapped in a skin of protein. An additional simplification is that its DNA strand is composed of only one molecule compared with as many as ten molecules for some other viruses.

A new problem raised by this discovery is how does the virus duplicate itself or reproduce?

Until now it has been believed that when a living cell divides, the two intertwined DNA strands pull apart, each serving as a kind of template or mold upon which a complementary strand is assembled. When

a virus invades a cell, it was thought, each strand "picks up" chemical compounds, nucleotides, from the cell fluid which then go into making new identical strands of DNA.

Now, Dr. Sinsheimer reported, it appears that a single strand is enough for the virus to multiply. Twenty minutes after the dwarf virus, Phi X, invades a cell, it forces the cell to manufacture about 300 Phi X viruses, each capable of infecting a new cell.

It is not known if the dwarf virus is unique or if other organisms have only one DNA strand. About two dozen kinds of DNA have been analyzed and all are in the double-strand form. The single strand, however, appears to be built on the same pattern as the usual double strand DNA. It is made up of "beads" of nucleotides.

Dr. Sinsheimer's research is supported by the U. S. Public Health Service and the American Cancer Society. It is possible that an altered DNA may be responsible for the formation of cancer cells from normal cells that have been genetically changed.

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PHOTOGRAPHY

Photogrammetry Aids Art

► EXACT reproductions of cultural-historical objects can now be made by photogrammetric charting methods.

In a demonstration at the Ethnological Museum, Stockholm, Sweden, by a research team from the Royal College of Technology headed by Prof. Bertil Hallert, various objects were presented in their original and copied forms, which showed how quickly, cheaply and simply the reproductions could be made.

For example, a dummy in historical costume, borrowed from the Nordic museum, had been photogrammetrically copied and later reproduced on a smaller scale. An African copper rooster from Nigeria had been reproduced in a metal alloy to full scale by the same technique.

In an exterior sketch of the Swedish Rosendal Castle, precise measurements of the roof were made possible by aerial photography, which could not have been done even by climbing up on the roof and measuring it.

Prof. Hallert said that the human visage may be charted by stereo-photography with contours, just as is done in charting a field sector. A mask can later be modeled from these contours.

Cultural-historical researchers and students will be admitted to photogrammetric training courses at the college's Institute of

Photogrammetry. Such technical training will be invaluable in making surveys of rural communities or reproducing ethnological costumes and objects.

It is high time, not least because of the present political tension in the world, Prof. Hallert emphasized, that adequate measures be taken to chart cultural-historical objects by this new photogrammetric method, and to store the material in bombproof archives.

Continuous control of the stored material's photographic quality would be necessary. We must not only plan ten or 100 years ahead, Prof. Hallert said, but we must plan in time units of thousands of years.

Science News Letter, March 21, 1959

MEDICINE

Gonorrhea Stages Rally As Penicillin Fails

► THE BELIEF that the gonorrhea bacterium is adapting itself to outfox penicillin has received additional support.

A study of 146 servicemen infected with gonorrhea and treated with a series of five daily injections of penicillin showed that there was a 20% failure to cure the disease, indicating that this venereal disease strain may be staging a comeback.

The study was conducted by Dr. Ernst Epstein of Marshfield, Wis., and appears in the *Journal of the American Medical Association* (March 7).

His study was conducted in 1958 while he was serving as a captain in the Army medical corps in Korea.

A treatment failure rate of 20% is unusual and unsatisfactory in view of the fact that the failure rate has been between one and five per cent, he points out. In addition, ten times as much penicillin was used on the group in this study as was used on the low failure rate groups.

Dr. Epstein cited earlier reports from Great Britain that indicated a growing resistance to penicillin by strains of gonorrhea.

Gonorrhea can no longer be considered lightheartedly as a disease with a certain cure and that affects the body to a lesser degree than the common cold. It is probably only a matter of time until resistance to penicillin will become a world-wide problem, he said.

In all likelihood, various types of "provocative" tests will again have to be performed to ascertain a cure.

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MEDICINE

FM "Broadcasts" Warn Of Heart Troubles

► ADVANCE WARNING of heart troubles to come may be foretold some day by FM "broadcasts" of sounds inaudible to the human ear.

This is the promise of research being carried out by Dr. Clarence M. Agress and Louis G. Fields of the University of California at Los Angeles Medical School and the Los Angeles Veterans Administration.

A new method of analyzing heart sounds in a broad range of frequencies has been developed. A special microphone placed over the heart picks up the many vibrations made by the heart. Electronic "ears" sensitive to particular frequencies help sort the various vibrations for recording on a multi-channel FM tape system.

Emphasis is on heretofore little studied low-frequency vibrations. These reflect activity of the heart muscle itself as well as valve sounds which dominate the usual audible range of the stethoscope and standard phonocardiogram.

Preliminary experiments have demonstrated subtle changes in heart vibration waves (spectrosonograms) induced by smoking or decreased oxygen supply, not apparent in electrocardiograms. Minute heart damage in experimental animals, also not reflected in the electrocardiogram, was detected by the new method.

Preliminary indications are that the new method may be a promising approach to much earlier diagnosis of heart problems and in estimating the functional status of the heart.

Instrumentation used in the study is being designed for inclusion in a "package" for physiologically monitoring space travelers.

Science News Letter, March 21, 1959

ENGINEERING

Detect Satellite Spies

Three systems of radio stations have been established to find and track satellites that may pass near the United States.

► A NETWORK of radio stations that can find and track silent and perhaps potentially dangerous reconnaissance satellites has been established across the southern portion of the United States as a protective measure.

The system is said to make it impossible for any nation to launch a satellite that passes near the United States without U. S. detection, even if the satellite does not send out a tell-tale beep-beep by radio.

Known as Spasur, which stands for Space Surveillance, the system is backed by the Advanced Research Projects Agency and is operated for ARPA by the Army's Ballistic Research Laboratories, Aberdeen, Md., and the Naval Research Laboratory.

Nine stations are now in operation. They work in clusters of three, so that the U. S. now has three complete systems forming an overlapping span across the southern U. S. This line is to be reinforced with other sets of three stations, but there is no present intention of drawing another electronic "Magenot line" across our space frontier farther north. It is believed that all satellites except those in a tight equatorial orbit will cut through the radio beams.

Beam of Energy

The middle station in each cluster is the transmitter. It is flanked by two receivers 250 miles away. The transmitter sends out a continuous fan-shaped beam of silent radio energy which hits and bounces off the satellites as they pass through it. This radio wave is similar to the radio signal sent out by a commercial broadcasting station in a moment of audio silence.

The receiving stations pick up the reflected radio signal. Since at least two stations "hear" the reflected radio, this enables operators to calculate the height, speed and direction of the satellites by triangulation and other methods.

Stations operated by the Naval Research Laboratory are active Minitrack stations, and stations operated by the Army Ballistic Research Laboratories are Doploc stations that use the Doppler principle taught in high school physics. Data received by the Navy-operated stations, which use the interferometer technique, are relayed instantly to the Naval Proving Ground, Dahlgren, Va., and also to the Naval Research Laboratory in Washington.

Data gathered through the Army-operated stations are sent to the Ballistic Research Laboratories, Aberdeen Proving Ground, Md. Eventually all data will be transmitted to Space Track, the Air Force Research Center at Cambridge, Mass.

The Army's stations are situated at Forrest City, Ark., Fort Sill, Okla., and White Sands Missile Range, N. M. The Navy's are at Fort Stewart, Ga., Jordan Lake, Ala., and Silver Lake, Calif. The Navy's second cluster is at Elephant Butte, N. M., Gila River, Ariz., and Brown Field, Calif.

Transmitters for the above clusters are situated at Jordan Lake, Fort Sill, and Gila River.

The favored way of tracking a man-made satellite is by sensitive receivers which detect and follow the radio signals emitted by the satellite itself. But some satellite radios are now dead, and some may be launched that do not have radio beacons. So the problem was to find a way of locating and tracking these satellites.

The urgency for such a system to track dead or silent satellites is underscored by current development of reconnaissance "moons." The Department of Defense sees them capable of photographing parts of the U. S. with a powerful lens, then transmitting the photographs by radio when passing back over the nation that sent it up.

Such moons also could eavesdrop on low-

power radio communications while over the U. S., or perhaps even slow down, by using reverse-thrust retrorockets, to become instruments of terror in wartime harassment.

Further urgency is imparted by the fact that some satellites might go unnoticed even though transmitting regularly on a radio frequency, it is understood.

Science News Letter, March 21, 1959

PHYSICS

Urge Relativity Tests Using Artificial Planets

► EINSTEIN'S theory of general relativity can be given a further test using artificial planets launched in the future, a United States scientist reports.

John J. Gilvarry of the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has calculated that man-made solar satellites would outclass natural ones in verifying general relativity. This is because the advance of an artificial planet's perihelion, or time of passage closest to the sun, can be made "significantly large."

At present, one of the three proofs of relativity, and the firmest, depends on the advance of Mercury's perihelion. The two artificial planets now orbiting the sun could not serve this purpose because their orbits are not known with sufficient accuracy, and the chances are high they will not be seen again.

But future space vehicles, launched with the idea of testing relativity theory, could do the job, Mr. Gilvarry suggests in *Nature* (March 7).

Science News Letter, March 21, 1959

BIOLOGY

Fire Ant Odor Trail Chemistry Studied

► SCIENTISTS may be hot on the trail of the imported fire ant—object of a multi-million dollar Federal eradication program.

Chemical trails laid down by worker ants are important since they guide the rest of the colony in its migrations and foraging for food. Now, Dr. Edward P. Wilson of Harvard University Biological Laboratories reports, it is known that the essential trail-blazing substance is a glandular secretion released through the fire ant's sting.

Working with the fire ant *Solenopsis saevissima* of a variety related to the imported fire ant, Dr. Wilson was able to direct foraging workers along artificial trails of freshly extracted venom that he had laid down. Further research pinpointed the substance as coming from the accessory gland which empties through the sting.

The substance, which seems to be chemically allied to or "even identical with" the toxic substance of the venom, apparently serves to orientate ants along the right path in addition to operating as a "releaser" in which the venom, for example, provides the trail.

Several problems as to the nature of the odor trail and the mechanism by which it is laid down still need to be studied, Dr. Wilson concludes in *Science* (March 6).

Science News Letter, March 21, 1959



RARE ALBINOS—A white corn snake and a white snapping turtle are examined by Dr. Max Hensley, professor of zoology at Michigan State University. Dr. Hensley is making a study of albinism in reptiles and amphibians. The turtle came from Ontario; the snake from Children's Nature Museum, Charlotte, N. C.

ZOOLOGY

Smithsonian Exhibits Elephant With 2-Ton Skin

▶ AN ELEPHANT with a two-ton skin was unveiled at the Smithsonian Institution's Natural History Building. The specimen is described as "the largest land animal of the modern world." It stands 13 feet 2 inches tall at its shoulder.

Shot in 1955 by Hungarian-born big-game hunter J. J. Fenykovi, who came across its huge tracks in 1954, while on a rhinoceros hunt in Africa, the elephant measures 20 inches taller than the famous Jumbo at the shoulder.

The skin was so heavy that a crew of 23 natives could not lift it. A truck load of salt was required to preserve it in the field. The skin was carried hundreds of miles through wilderness for shipment to the Smithsonian Institution.

In shaping the hide to depict an alert animal moving at a fast walk, trunk lifted and ears fanned out, Smithsonian taxidermists used more than 11,000 pounds of clay.

Science News Letter, March 21, 1959

ENGINEERING

Road-Building Machine Has 8 Electric Wheels

▶ A NEW ROAD-BUILDING machine has eight electrically driven, six-foot wheels. It can self-load and haul 50 tons of dirt in one trip.

Built by R. G. LeTourneau, Inc., Longview, Texas, the machine has an electric motor geared into the hub of each wheel. These motors, as well as other motors spotted over the machine, are powered by a dynamo under the hood, which is driven by a 600-horsepower diesel engine.

The machine has two "buckets," not so much to haul the 50-ton capacity, but mainly to facilitate self-loading. The rear bucket serves as a pusher to help load the front bucket. The weight of the loaded front bucket then increases tire traction to help pull-load the rear bucket.

During this operation, the bottom of each bucket becomes a huge electrically controlled spade, digging and scooping to load itself.

Simple electric controls govern all functions of the 74-foot-long machine. No clutches, transmission or other mechanical-drive components are used.

Science News Letter, March 21, 1959

ENGINEERING

"Laminated" Ceramic-Metal for Jet Engines

▶ "LAMINATED" ceramics and metals offer a new approach to the problem of making a heat-resistant material suitable for missile cones or jet engines of the future.

Attempts to combine ceramics and metals, strongly encouraged by the Air Force since World War II, have so far been concentrated on joining the individual particles of ceramics and metals, somewhat like mixing

salt and pepper. The results have been generally unsatisfactory.

Under the new concept evolved by Prof. Francis R. Shanley and William J. Knapp of the department of engineering at the University of California at Los Angeles, molten metals and ceramics are first flame-sprayed in alternate thin layers on a rotating disk.

After cooling, the layer "cake" is crushed into small grains, with each grain retaining the laminated, or layered, ceramic-metal structure. The grains are then hot-pressed in a graphite mold at temperatures of up to 2,200 degrees Fahrenheit.

The resultant ceramic-metal, or cermet, material resists both extreme heat and pressure. The mixture is considerably less brittle than ceramics, because the metal layer provides "slippage" for the ceramic layer.

Encouraging results have been attained by mixing 70% to 80% aluminum oxide for the ceramic layers with 20% to 30% stainless steel for the metal layers.

The two UCLA engineers hope that ultimately the laminated cermet mixture, besides its military potential, will have numerous civilian uses, especially for load-bearing structures exposed to very high temperatures.

Science News Letter, March 21, 1959

METEOROLOGY

Weather Bureau Will Report Discomfort Index

▶ MANY UNITED STATES Weather Bureau offices will this summer for the first time report the "discomfort index" on an experimental basis.

The discomfort index is a combined measure of the temperature and relative humidity. It is the weatherman's modern version of the old saying, "It's not the heat, it's the humidity."

Although every person has a differing reaction to the heat and humidity, Earl C. Thom, a Weather Bureau climatologist, has calculated the discomfort index based on averages. Index figures will enable managers of all kinds of buildings to judge when they should turn on their air conditioners, and public utilities to judge the power load therefore required.

The discomfort index is the figure 15 added to four-tenths of the sum of the dry and wet bulb thermometer readings. Ordinary household thermometers are dry bulb instruments. Wet bulb ones measure the air's dryness.

The discomfort index reaches 75, which many persons find oppressive, when the temperature is 75 degrees Fahrenheit and the relative humidity is 100%. It is also 75 when the temperature is 80 degrees and the relative humidity 60%, or the temperature is 85 degrees and the relative humidity 30%.

Mr. Thom, who invented the term, "discomfort index," estimates that in the summer about 10% of the population will be uncomfortable even before the index reaches 70. When it passes 75, more than half will be uncomfortable. At 79, all persons will be uncomfortable, and many will be acutely miserable.

Science News Letter, March 21, 1959

IN SCIENCE

METALLURGY

Alloy Is Strong as Steel And More Machinable

▶ A NEW STEEL-like material may offer engineers a replacement for plain steel forgings and permit design flexibility of castings.

It was developed by General Motors Central Foundry Division and GM Research Laboratories, and described to the American Foundrymen's Society meeting in Milwaukee, Wis.

Known as CentraSteel, the material consists of iron plus the following elements: 1.70% carbon, 2.25% silicon, 0.40% manganese, 0.10% sulfur, 0.05% phosphorus, 0.01% boron and some tellurium.

The metal has a high elastic modulus of 28,000,000 pounds per square inch, very nearly equal to that of steel. This means it will not deform until this pressure is exceeded. The material has the equivalent strength of steel and better castability and machinability. It does not require extensive heat treatment, costly addition agents, injection apparatus or low maximum sulfur content.

The material's high silicon, low carbon content is the reverse of normal iron founding experience, but this proportion accounts for the material's high modulus and great versatility. This high elastic modulus suggests applications to parts for which many presently available cast materials would be unacceptable.

The metal is still in an experimental stage. Work is underway on foundry problems that will have to be solved before high-volume production is begun.

Science News Letter, March 21, 1959

OCEANOGRAPHY

Wind to Chill Water Along Florida Coast

▶ WIND WILL lower temperature of an 85-mile stretch of Florida coast water by some ten degrees this summer, oceanographers of the U. S. Coast and Geodetic Survey report.

While the water along the coast below Charleston, S. C., is usually in the mid-80's during July and August, there is a very good chance that the water between Daytona Beach and Canova Beach will be a mild 75 degrees Fahrenheit.

After analyzing water temperature, sea level and winds, Charles B. Taylor Jr. and Dr. Harris B. Stewart Jr. found that the wind was responsible for the lowered temperatures. The prevailing winds, blowing out to sea, sweep the warm surface water out to sea and allow the cooler water below to "upwell" and come to the surface. There is also a slight drop in sea level in the area of the Daytona-Canova beaches.

Science News Letter, March 21, 1959

CE FIELDS

DENTISTRY

Most False Teeth Could Have Been Prevented

► FALSE TEETH are usually the result of years of slipshod dental hygiene.

Most dentures could be "postponed forever" if individuals would only take proper care of their teeth, Mrs. E. Arthur Underwood, D.D.S., Vancouver, Wash., said at the 14th National Conference on Rural Health meeting in Wichita, Kans.

Dentist Underwood's solution? Start with youngsters. Children should be taken to the dentist at about age three. Instill in them the necessity of brushing, including the correct technique and length of time, three minutes twice a day.

Switch after school snacks to celery sticks and carrots, radishes, tomatoes, or even cheese wedges or left-over meat cubes on colored toothpicks. Cut down on the amount of gooey candies, snacks or party dishes.

In addition to these rules, which also apply to those not exactly in the "younger" set, frequent visits to the dentist to have cavities filled are a "must" on the list. The tartar that accumulates on the enamel should be removed periodically, too.

Dr. Underwood, who also is president of the Woman's Auxiliary to the American Medical Association, emphasized the role that fluoridation plays in the prevention of caries, tooth decay, by making the teeth disease-resistant. If fluoridated water is unavailable, the dentist can apply fluorides to the teeth themselves, she said. The use of fluoride can reduce the amount of caries a dentist will see in his practice by from 40% to 50%.

Dental disease is the nation's most chronic and expensive health problem, she said.

Science News Letter, March 21, 1959

MEDICINE

Student Suicides Cause Concern in England

► THE BRITISH are concerned over the large number of suicides in English universities, especially the older institutions, Cambridge and Oxford, Sir Alan Rook of the University of Cambridge reports in the *British Medical Journal* (March 7).

Statistics compiled by the University Health Service during the past ten years show that the commonest cause of undergraduate death is accident, but this is followed closely by suicide, Sir Alan reports.

Comparison of the suicide figures for men at the universities with men aged 20-24 in the general population of England and Wales showed that the rate per 100,000 living is 21.8 for Cambridge and 30.5 for Oxford as compared with only 6.1 for the general population. The suicide rate among men at seven British universities is only 7.9.

The suicide rate at Yale University in the United States is much lower than at Oxford and Cambridge, 13.0, but there, too, suicide is the second most frequent cause of student death.

The rate for women students is much lower than for men. In a student population of about 40,000, of which 20% were women, there were only two woman suicides.

A striking finding at Cambridge is the high incidence of suicide among colored undergraduates. In the average year, there are about 350 dark-skinned students and the suicide of three of these men in the ten-year period gives a very high rate of incidence—85.7 per annum per 100,000 living. But Sir Alan comments, "in view of the smallness of the numbers involved, this figure must be regarded with suspicion."

Two periods of time seem to be important in connection with the student suicides: near examination time and at the beginning of the academic year. There were five deaths in May, two in June, four in October and one each in January, March and April.

Science News Letter, March 21, 1959

TECHNOLOGY

Lamp May Improve Health and Moods

► THE FLIP of a light switch may soon bring relief to asthma, hay fever and sinus sufferers, and even persons "feeling down in the dumps."

The switch would control a special ultraviolet lamp that researchers at the Westinghouse Electric Corporation are now developing. The lamp produces sizable amounts of negative air ions, tiny charged particles that circulate in the air we breathe.

Evidence in recent years indicates that these ions have a pronounced effect upon our health and even our moods, E. G. F. Arnott, director of research for the Westinghouse Lamp Division, said.

When the air is charged with positive ions, there is a noticeable increase in discomfort, Mr. Arnott said scientists have found. The discomfort may take the form of fatigue, dizziness, headache, asthma and sinusitis. The positive ions have also been found to affect rheumatism and arthritis, cause mental depression and slow healing according to some reports.

But when people or animals were subjected to air containing negative ions, scientists noted a definite improvement in comfort.

It has been generally known for many years that Sterilamp ultraviolet tubes produce ions. These lamps have been in use in hospitals, schoolrooms, air conditioning systems, and for poultry and food protection. Occasionally reports were received that certain lamps relieved asthma. It was assumed that the minute amount of ozone generated by the lamp oxidized the allergens and thus relieved asthma.

Now it appears that the relief was due to the negative ions produced by the lamp. Lamps are now being tested for future installation into home air conditioners and heating systems.

Science News Letter, March 21, 1959

ENGINEERING

New Radar Design May Improve U. S. Defense

► ENEMY MISSILES may be detected as far as 3,000 miles from our shores as a result of a newly-found design principle for radar antennas. At the 15,000-mile-per-hour speeds of today's intercontinental ballistic missiles, this could mean 12 minutes' warning.

The principle, known as TETRAC (Tension Truss Antenna Concept), is claimed to offer greater accuracy, higher rigidity-to-weight ratio, and lower construction and maintenance cost than conventional methods. It was developed by Narmco Industries, Inc., and will enable engineers to build radar antennas more than 20 stories high.

David L. Grimes, president of Narmco, said TETRAC "will enable us to extend the range of our defense radars so that we can determine the precise distance, speed and direction of missiles better than 3,000 miles away, within minutes after they are launched."

Essentially, the TETRAC antenna consists of a series of concentric compression rings made of lightweight metal, plastic, glass fiber or other sandwich material for optimum rigidity at light weight.

These rings hold a giant reflector made of solid sandwich or open mesh material, and are stabilized by pre-stressed radial tension rods that work on the principle of giant bicycle spokes.

The new design makes possible the fabrication, erection and operation of radar antennas to extremely close tolerances while maintaining a highly efficient ratio of weight to deflection, Narmco engineers said.

The lightweight reflectors can be transported and assembled easily and conveniently. Their parts are interchangeable.

TETRAC is also expected to facilitate important advances in space technology, radio astronomy and the harnessing of solar energy for practical use.

Science News Letter, March 21, 1959

CHEMISTRY

Intense Reactor Heat May Catalyze Chemicals

► THE INTENSE radioactive heat found deep in the heart of an atomic reactor may offer a promising way of making chemicals more easily and profitably.

Atomic Energy Commissioner Willard F. Libby told a forum on natural resources conservation meeting in Washington that a "chemical reactor" has been proposed for production of nitric acid.

The Atomic Energy Commission has been asked to study feasibility of irradiating air in an air-cooled type reactor to make nitrogen oxide, the precursor to nitrogen dioxide and nitric acid.

Dr. Libby said this is such an early development it is "very difficult to assess," but that "the possibilities look bright and encouraging, and there may be other instances of where chemical reactions may be profitably catalyzed by the intense radiation in atomic reactor."

Science News Letter, March 21, 1959

ENGINEERING

Adventures of a 4c Stamp

Orbital post offices probably will be here some day, but right now the Post Office is developing more immediate ways to achieve its goal of one-day mail service anywhere in the U. S.

By ALLEN LONG

► THEY ARE talking about satellite post offices to orbit the earth and give swift mail service from here to yon. But that is blue-sky stuff—although dreams often come true sooner than expected. Much more urgent at the moment is finding immediate ways to improve our earth-bound postal system. It has been estimated that in a generation's time, the entire U. S. labor force will be unable to cope with the flow of America's letters and packages by using today's methods.

Today's methods are essentially the same as in Ben Franklin's day. Each of the 60 billion letters and packages mailed in the U. S. is processed largely by hand. Handling by automatic machines now appears to offer the most hope for meeting the tidal wave of mail that grows by about 2 billion pieces a year.

The day may be near when post office workers will think of their shop as a "plant" rather than an "office."

Briefly, here is what will likely happen to a letter in the immediate future: It will be collected from the corner red-and-blue mailbox and carried back to the post office. It may be swept high into the rafters by a conveyor system which holds it there awaiting its turn at the equipment below. Then it may be dumped along with parcels, hotel keys, wallets, and baby chickens—even the family kitten once was "mailed" by a toddler—onto a conveyor belt that feeds a culling machine.

Mechanical Hands

Mechanical linkages will skim off the letter and dispatch it to facing, canceling, and distributing machines. Here other mechanical "hands" may flip it around so that the stamp faces the proper direction for canceling. Then a machine which figuratively squints an eye at the typewritten address on the letter will decide which mail sack should receive it. A conveyor will carry it to the proper point, then drop it. In another few minutes, the letter may be on its way out of town.

Arriving at its destination, the letter may run through other machines to be fed automatically to the proper delivery sack. Then friendly hands, missing so far, now will put the letter in the front-door mailbox.

All this may sound as futuristic as the satellite post office. But that is not so. The post office, with help of private industry, already has moved a great distance toward its dreamed-of 24-hour mail service in the U. S.

The Department installed in Detroit in

December, 1956, its first electronically controlled "Mail Flo" conveyor system. This shuttles mail to and from sorting areas, eliminating hand-trucking. Side conveyors feed mail to sorting clerks, then take letters to proper dispatching points. The system worked so well that other installations were announced late last year for post offices in New York, Boston, Washington, Chicago, Los Angeles, and Ogden, Utah. All told, there are 11 such systems now in use.

The Department already is using a machine for facing mail and canceling stamps at the rate of 15,000 an hour. And developmental work is approaching a climax on equipment that culls, faces and cancels mail in an integrated operation. This machine will handle 30,000 letters an hour.

Rabinow Engineering Company, Takoma Park, Md., working with the Post Office Department and the National Bureau of



AUTOMATIC MAIL HANDLER—*This prototype can handle 36,000 letters an hour. The little wheel assemblies carry letters. Each of the 12 wheels on each rod can be shifted into one of two positions, giving a total of 4,096 possible combinations. As the conveyor moves, each set of 12 wheels rolls over tracks. When correct destination is reached, all wheels drop into depressions and the letter falls into correct pocket. The prototype was developed for the Post Office by Rabinow Engineering Company and National Bureau of Standards.*

Standards in Washington, has developed a prototype machine to handle and distribute 36,000 letters an hour into as many categories as needed. Right now, the "thinking" operation is handled by a man. Each letter is presented so he can see the address. He punches a group of keys which imprint a code on the back of the envelope. The machine does the rest.

President Jacob Rabinow said it took three years to develop the machine. It has a memory for 200,000 to 300,000 individual addresses in Washington, D. C., where it is now being tried out.

Machines now are being developed, he said, which can read typewritten addresses, and get letters on their way to proper mail sacks in about one-tenth of a second.

Most machines of this sort scan the letter the way a television beam scans the screen. The light and dark signals are stored in patterns, and the machine says to itself: "This looks a little like an 'a' and a 'b'." Then the machine studies the character to decide whether it is more like an "a" or a "b".

The day is coming, experts predict, when machines may even be able to read handwriting. There will always be some sort of a reject gadget for letters with addresses too illegible to be machine-read.

Cooperative Projects

The Post Office Department has various projects under way with industry. In addition to Rabinow Engineering Company, private companies associated with the Department on various projects include American Machine & Foundry Company, New York City, and Emerson Research Laboratories, Silver Spring, Md., to develop machines that cull, face, and cancel 30,000 an hour in a single coordinated operation; Burroughs Corporation, Detroit, and Pitney Bowes Inc., Stamford, Conn., for keyboard-operated sorters; Intelligent Machines Research Corporation, Alexandria, Va., for machines that read typewritten addresses; Jervis B. Webb Company, Detroit, and Aerojet-General Corporation, Azusa, Calif., for parcel post sorting systems; Electric Vendors, Inc., Minneapolis, for a jukebox-like machine to sell postal supplies; and Food Machinery and Chemical Corporation, San Jose, Calif., for machines to handle rolled newspapers, flat magazines, etc.

And in February, the Post Office Department signed a contract with Intellex Systems, a subsidiary of International Telephone and Telegraph Corporation, for a "turnkey" post office—the first to be fully mechanized. When completed, the employees will simply "turn the key, walk in, and start moving the mails," said Edson O. Sessions, deputy postmaster general.

This is scheduled for Providence, R. I., and is expected to speed deliveries of all classes of mail to 14 nearby communities.

The plant will have central electronic con-

trol of all activities in the office. Machines will sort parcels and letters, and synchronized conveyors will bring mail into the plant, shuttle it among processing machines, then carry it out.

The post office will be situated strategically next to railroad facilities only five minutes from downtown Providence and 20 minutes from the airport.

Many automated post offices can be expected in the future. But at the moment, Post Office Department officials believe the first ones will have to be used where mail flow hits at least 200,000 pieces a day.

Figures are not available to indicate whether automated post offices would be feasible in towns of 20,000 population. It is not the population that counts, but mail volume.

In general it is thought post office automation will not portend any big changes in what can be mailed. Automatic machines are being designed to handle letters up to ¼-inch thick, six inches high and 14 long. For off-sized letters, thank-you notes and greeting cards, which the machines might be unable to handle, the post office may ultimately have to charge special postage to compensate for hand-processing.

You can see what the Post Office Department is up against: Postmaster General Arthur E. Summerfield told Congress at 1959 budget hearings that the Department handled 50.9 billion pieces of mail in 1953. But by 1958, the volume reached 61.4 billion, an increase of 10 billion pieces in five years. This year, mail volume is expected to set a 63.5-billion-piece record. This would be a 24.7% increase over 1953, and handling this volume will require 562,000 man-years' labor.

Mail Costs Rise

Postal rates already have been jacked up several times in recent years, yet post office books are still colored with red ink. The Post Office Department estimates it will cost \$53.85 to handle each 1,000 pieces of mail in 1959. If each piece carried four cents of postage, the Department's revenue would be \$40. Therefore, it would lose \$13.85 on each 1,000 pieces it handled.

The Post Office gets four cents an ounce only on first-class mail, and there is a huge bulk of other mailed material which is handled at lower rates.

Unless something is done, the Department may find itself running headlong into a situation both physically and economically impossible.

The day is coming when automatic machines will likely handle a sizable hunk of the total mail volume. Officials believe automation is its most currently promising salvation. In addition to speedier, cheaper mail handling, the purpose of automatic mail-handling machines is not to replace men but rather to cut down on the number of new employees that will have to be hired in the future.

And the new cost-cutting, mail-speeding machines being developed hold thrilling roller coaster-like adventures in store for your stamps in the very near future.

Science News Letter, March 21, 1959

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ADVANCES IN BIOLOGICAL AND MEDICAL PHYSICS, Vol. VI—Cornelius A. Tobias and John H. Lawrence, Eds.—*Academic*, 639 p., illus., \$16.50. Includes chapters on fallout, on the effects of ionizing radiations and on cell studies.

THE ANCIENT MARINERS: Seafarers and Sea Fighters of the Mediterranean in Ancient Times—Lionel Casson—*Macmillan*, 286 p., illus., \$5.95. Recounts developments in ship design, methods of naval warfare, winds, currents and harbors of the Mediterranean.

ANIMAL LIFE—Lorus J. Milne and Margery Milne—*Prentice-Hall*, 367 p., illus., \$6.95. Textbook introducing living things, particularly as they are related to man and he to them.

AUSTRALIAN ROAD PRACTICE: An Introduction to Highway Engineering—H. M. Sherrard—*Melbourne Univ. Press (Cambridge Univ. Press)*, 407 p., illus., \$19.50. Of interest to engineers and students in countries which have similar climatic and traffic conditions as Australia has.

BIRTH OF AN ISLAND—Millicent E. Selsam—*Harper*, 48 p., illus., by Winifred Lubell, \$2.50. Tells of how plants and animal life came to a new volcanic island. For the grade school child.

CAMELLIA CULTURE—E. C. Touje, Ed.—*Macmillan*, 484 p., illus., \$11.50. Compendium of latest scientific practices, including chapter on radiation genetics.

THE CELLULAR SLIME MOLDS—John Tyler Bonner—*Princeton Univ. Press*, 150 p., illus., \$4. Survey of the different known aspects of the biology of the cellular slime molds.

DIAMONDS—Herbert S. Zim—*Morrow*, 64 p., illus., by Gustav Schrotter, \$2.50. Informative reading for boys and girls.

DIGGING INTO HISTORY: A Brief Account of Fifteen Years of Archaeological Work in New Mexico—Paul S. Martin—*Chicago Nat. Hist. Mus.*, 157 p., illus., by Gustaf Dalstrom, paper, \$1.50. Discoveries about the Mogollon Indians.

EAT WELL & STAY WELL—Ansel and Margaret Keys, foreword by Paul Dudley White—*Doubleday*, 359 p., \$4.95. Combines the science of nutrition with expertise in the culinary arts.

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F. Kettering—*Science Service* with International Edison Birthday Celebration Committee, 35 p., illus., paper, 25¢. Contains experiments selected from Faraday's diary and Edison's notebooks.

THE EDUCATION OF WOMEN: Signs for the Future—Opal D. David, Ed.—*Am. Council on Educ.*, 153 p., paper, \$2. Report of a Conference on the Present Status and Prospective Trends of Research on the Education of Women.

EXPLORING SCIENCE—Jonathan N. Leonard—*World Pub. Co.*, 318 p., illus., by Louis Darling and I. N. Steinberg, \$4.95. The story of man's scientific achievements in winning mastery over his environment, told for young people.

THE FAMILY MEDICAL ENCYCLOPEDIA—Justus J. Schifferes—*Little*, 617 p., illus., by Louise Bush, \$4.95. A home reference book of medical care.

THE FEARFUL CHOICE: A Debate on Nuclear Policy—conducted by Philip Toynbee with 22 Britishers—*Wayne State Univ. Press*, 112 p., \$2.50. Explores opinions regarding nuclear policy pertinent to British defense.

FLORENCE SABIN: Colorado Woman of the Century—Elinor Bluemel—*Univ. of Colo. Press*, 238 p., illus., \$5.50. Scientist and humanitarian.

FLY REDWING FLY—Lloyd Lózes Goff—*Lothrop*, 28 p., illus., by author, \$2.75. Life story of a redwing, beautifully illustrated.

GLIDING: A Handbook on Soaring Flight—Derek Piggott—*Macmillan*, 261 p., illus., \$5. Comprehensive guide to gliding, written by a British flight instructor.

GOATS—Wilfrid S. Bronson—*Harcourt*, 64 p., illus., by author, \$2.95. Informative and humorous book for young boys and girls.

THE GRAFTER'S HANDBOOK—R. J. Garner—*Oxford Univ. Press*, 2nd ed., 260 p., illus., \$5.75. Contains everything the amateur or professional gardener needs to know about grafting.

THE GREAT DECISION: The Secret History of the Atomic Bomb—Michael Amrine—*Putnam*, 251 p., \$3.95. The story of the personalities, the events and decisions which led to the use of the atomic bomb in World War II.

HEATH ELEMENTARY SCIENCE 1959—Herman and Nina Schneider—*Heath*, six-book series, illus., grade 1: 154 p., \$2.20; grade 2: 216 p., \$2.44; grade 3: 282 p., \$2.68; grade 4: 314 p., \$2.80; grade 5: 346 p., \$2.92; grade 6: 378 p., \$3.08. Includes many experiments with simple materials.

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George Sarton—*Harvard Univ. Press*, 554 p., illus., \$11. The late author's purpose was "to explain the development of the scientific spirit, the history of man's reactions to truth."

INSIDE THE LIVING CELLS: Some Secrets of Life—J. A. V. Butler—*Basic Bks*, 174 p., illus., \$3.50. Nontechnical account of the mechanism of cells, their reaction to radiation, and their transformation into malignancies.

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THE MAMMALS OF IRAQ—Robert T. Hatt—*Mus. of Zool., Univ. of Mich.*, 113 p., 6 plates, paper, \$1.50. Records the results of an investigation conducted in Iraq in 1952/53 on a Fulbright grant.

MAN AND SCIENCE: A Study of Mankind, Past and Present—Ben Day Smith—*Exposition*, 126 p., illus., \$3. An attempt to evaluate man as an intelligent biological product, and science as it affects man.

MAN IN THE PRIMITIVE WORLD: An Introduction to Anthropology—E. Adamson Hoebel—*McGraw*, 2nd ed., 678 p., illus., \$9. For the student, the worker in other sciences, and the lay reader.

MY PARTNER, THE RIVER: The White Pine Story on the Susquehanna—R. Dudley Tonkin—*Univ. of Pittsburgh Press*, 276 p., illus., \$6. A story of lumbering, based on actual records.

NATURE STORIES FROM THE VIENNA WOODS—Lilli Koenig, foreword by Konrad Lorenz—*Crowell*, 159 p., illus., by author, \$3.50. Biographies of little animals observed from a wildlife research station deep in the woods around Vienna, Austria.

THE NEW BACKGROUND OF SCIENCE—Sir James Jeans—*Univ. of Mich. Press*, 312 p., paper, \$1.95. Reprint of 1934 edition.

NOMENCLATURE OF ORGANIC CHEMISTRY 1957—International Union of Pure and Applied Chemistry—*Butterworths (Canada)*, 92 p., \$4. Definitive rules for hydrocarbon, heterocyclic systems and steroids, and tentative rules for the vitamin B₁₂ field.

NUCLEAR SCIENCE ABSTRACTS: Subject and Author Indexes, Vols. 5-10, 1951-1956—Everett J. Hoffman—*U. S. Atomic Energy Comm. (Govt. Print. Off.)*, 1038 p., paper, \$5.25. Covers not only unclassified and declassified US-AEC research reports, but also material from other U. S. and foreign government agencies, universities and industrial research organizations.

OUR EARTH: The Properties of Our Planet, How They Were Discovered, and How They Came into Being—Arthur Beiser—*Dutton*, 123 p., illus., \$3.25. Concise geophysics for the general reader.

AN OUTLINE OF PHOTOGRAMMETRY—K. Schwedsky, transl. from German by John Fosberry—*Pitman*, 326 p., illus., \$13. Describes fundamental principles and the various instruments and methods of aerial mapping.

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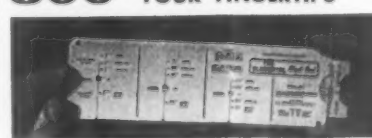
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PRINCIPLES OF MODERN PHYSICS—Robert B. Leighton—*McGraw*, 795 p., illus., \$12.50. Textbook for fourth-year physics major or first-year graduate course, including recent advances and numerous exercises.

RESEARCH IN EDUCATION—John W. Best—*Prentice-Hall*, 320 p., \$5.75. Theory and application of educational research, with bibliographies.

RESEARCH IN SPACE SCIENCE: Special Report No. 20—L. G. Jacchia and others—*Smithsonian Astrophysical Observatory*, 46 p., illus., paper, single copies free upon request direct to publisher, Cambridge 38, Mass.

SAFE HANDLING OF RADIOISOTOPES—*International Atomic Energy Agency (Internat'l Publ.)*, 99 p., paper, \$1. First publication of the agency, located in Vienna, Austria.

THE SCIENTIFIC REVOLUTION: Challenge and Promise—Gerald W. Elbers and Paul Duncan, Eds.—*Public Affairs Press* in coop. with President's Comm. on Scientists and Engineers, 280 p., \$6. Based on conference held at Yale, on "America's Human Resources to Meet the Scientific Challenge."

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SOCIOLOGY TODAY: Problems and Prospects—Robert K. Merton, Leonard Broom and Leonard S. Cottrell, Jr., Eds.—*Basic Bks.*, 623 p., \$7.50. Issued in association with the American Sociological Society.

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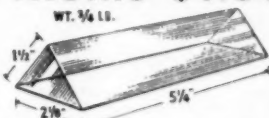
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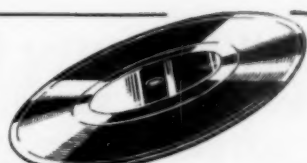
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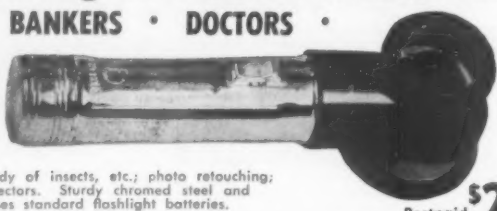
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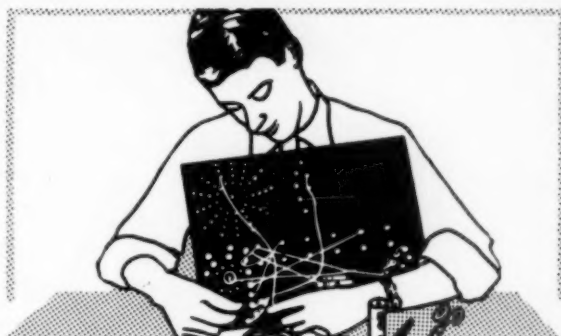
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WHO IS EDMUND C. BERKELEY? Author of "Giant Brains or Machines That Think," Wiley, 1949, 270 pp. (15,000 copies sold); Author of "Computers: Their Operation and Applications," Reinhold, 1956, 366 pp.; Editor & Publisher of the magazine, *Computers and Automation*; Maker and Developer of small robots; Fellow of the Society of Actuaries; Secretary (1947-53) of the Association for Computing Machinery; Designer of all the Tyniacs and Brainiacs, more than half of the 33 Geniacs (1955); Designer of the patented Multiple Switch Disc and other features in the 1955 Geniac kit.

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- Manual "Tyniacs: Small Electric Brain Machines and How to Make Them" by Edmund C. Berkeley, 1956, 48 pages—includes Introduction to Boolean Algebra for Designing Circuits.
- "How to Go from Brainiacs and Geniacs to Automatic Computers" by Edmund C. Berkeley.
- Dr. Claude E. Shannon's historic 1938 paper given before the American Institute of Electrical Engineers: "A Symbolic Analysis of Relay and Switching Circuits," 12 pages.
- List of references to computer literature including "Minds and Machines" by W. Sluckin, published by Penguin Books (Baltimore), 1954, 233 pages, and other references.

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New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 979. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

• **BARBECUE CHARCOAL SCUTTLE** is of shiny black polyethylene and supposedly cannot be damaged by stains from the sooty briquets. A tight-fitting lid converts the scuttle into a spill-proof storage bin for charcoal. A wire bail with plastic handle facilitates carrying, lifting and pouring.

Science News Letter, March 21, 1959

• **ROSIN FLUX** for use in soldering has relatively low conductivity in its raw state. But during soldering, its conductive constituents are destroyed and the flux residue becomes highly resistive. This is an important feature in circuitry soldering, where the flux is said to be especially valuable.

Science News Letter, March 21, 1959

• **FISH NET** has three handles that screw together for extra length. The angle of the hoop net may be changed with a slight wrist movement, giving a greater net area that is more parallel with the water's surface. Made of aluminum, the net is said to float.

Science News Letter, March 21, 1959

• **SAFETY JACKET AND PANTS** of vinyl sheeting are lightweight, weather-resistant and stay pliable in cold weather. The material's high dielectric strength offers telephone linemen protection against electricity. When used in chemical plants, the



items, shown in the photograph, offer resistance to acids, oils, alkalis, and will not mildew. They resist abrasion and are said to be simple to repair if punctured.

Science News Letter, March 21, 1959

• **HANGING DEVICE** for mounting a cup and saucer, together, on a wall or cabinet is made of solid brass with antique gold colored finish. It consists of two parallel

coil springs attached to four turned-in hooks, which hold the saucer. At the top is a center loop which holds the saucer to the wall, and a larger center hook, from which the cup is suspended by its handle.

Science News Letter, March 21, 1959

• **THREE-DIMENSIONAL MAP** of the United States is formed of durable plastic that children can draw or paint on, then erase or wash off. It measures 18¼ inches by 28¼ inches.

Science News Letter, March 21, 1959

• **METAL UTILITY CANS** for holding lubricating oils, chemicals, and other liquids can be stacked end to end. They come in 2½-gallon, 5-gallon and 40-pound fluid grease sizes. Reversible pouring spouts stored inside the cans during shipment clinch on the outside for fast, smooth dispensing.

Science News Letter, March 21, 1959

• **BUFFING COMPOUND REMOVER** is a liquid detergent that penetrates and dissolves hardened compounds by forming soluble soaps with them. Mixed with water and used at 150 to 200 degrees Fahrenheit, it will remove buffing and polishing compounds from steel, nickel plate, copper, brass, aluminum and most other base metals.

Science News Letter, March 21, 1959



Nature Ramblings



By HORACE LOFTIN

► THE NATURALIST, who had trouble keeping even a geranium growing, was more than surprised to see the results of his little experiment. The previous spring he had discovered an intriguing plant growing on the forest floor and transplanted it in his back yard. The plant promptly withered away and was totally forgotten.

But on this early spring day, on what appeared barren ground the day before, were a half dozen striking white flowers, made all the more beautiful by their simplicity. Surrounding each blossom was the oddly lobed leaf of the plants he had put down the year before.

The plant was the bloodroot, a harbinger of spring almost everywhere east of the Mississippi.

The naturalist had missed seeing the emerging plants the day before because the three- to four-inch leaves are tightly wrapped around the flowering stalk, and

Wild Poppies



so are scarcely visible, until they unroll almost overnight.

There are other characteristics about this low and lowly spring wildflower as intriguing as its unusual leaf.

Its name, for example. If you break the rootstock, a bright orange-red juice appears, looking for all the world like blood. Hence, "bloodroot" as a name, and this is even carried over into its scientific title, "Sanguinaria," which refers to blood. Of course, a multitude of myths and folk tales have

grown up around this forest plant on the basis of its "bleeding."

The bloodroot is a member of the poppy family. This group, characterized by milky or colored sap and showy flowers, is a great contributor to our stock of wildflowers. Also numbered among the wild poppies are the celadine, cream-cup, matilja poppy, tree poppy, California poppy and many others.

Bloodroot is a native wildflower. Celadine is a stowaway from Europe, slipping into this country hidden among the belongings of the early settlers. Today it is well-naturalized, its clusters of bright yellow flowers appearing especially near abandoned farmhouses.

The California poppy, a low-growing plant with bright blossoms, is one of the best known of our western wildflowers. As one admirer described it, "there are few sights so colorful as a treeless expanse of rolling hills aflame with millions of these golden flowers, crowding each other so closely that no earth or foliage is visible."

Science News Letter, March 21, 1959

